Fire support
Today’s artillery: fire support and protection down to the lowest level

Since 2008, operations have been characterized by an increasingly severe context and higher demand for artillery, down to the lowest levels. As the only branch capable of providing fire support at all conditions, its use has become indispensable. No air-land operation is planned without permanent mortar or gun fire support. The principle of “not move without combat support” is once again a reality. Today, technical and tactical artillery capabilities have evolved considerably: high strategic mobility, precision guided ammunition, a reduced logistics footprint, ground-air protection and dynamic management of air-land space.

Artillery performs two key functions:

Indirect Fire Support to guarantee commander freedom of action
Operating at a distance, it uses intelligence to identify, strike high-value targets and weakens the opponent before contact, and subsequently contributes to enemy destruction in support of troops in combat. Permanent, due to its continuous capabilities, and responsive, it provides a full range of effects and guarantees for decision makers precise and controlled strikes.

Air defense to protect the air-land forces, sensitive sites and populations
Able to maneuver in insecure environments on the ground and following the pace of land units, integrated into the joint chain of command and operating in coordination with French Air Force resources, artillery participates in foreign and national theaters protection in the frame of reinforcement of the permanent safety posture.

Artillery is currently organized in regiments within combined arms brigades. Its strength lies in its ability to be integrated down to the lowest tactical levels (combined tactical battle group or company). Therefore, each combined arms brigade has a mixed artillery regiment that trains and prepares for deployment with direct engagement battle group (infantry and armor).

Artillery Organization:

Each artillery regiment, inside light and medium brigades is organized in:

- two field artillery batteries able to fire the 155 mm CAESAR guns and 120 mm mortars;
- a short-range air defense (SHORAD) battery firing MISTRAL missiles;
- an intelligence battery dedicated to brigade.

Three specific regiments (RA) are part of the heavy armored and mechanized brigades:

- the 40th RA equipped with self-propelled armored tracked vehicle named AUF1;
- the 1st RA equipped with two unitary rocket launcher (URL) batteries and two radar batteries (COBRA);
- the 54th RA is the air defense regiment, organized in four short range air defense batteries (SHORAD) and two tactical coordination batteries (TCB) for 3rd Dimension space management and implementation of high-speed data links.
Numerous capabilities implemented during recent operations

Afghanistan and Ivory coast

Permanent fire support

Since 2008, operations have been characterized by a renewed use of artillery, which has been deployed in combined tactical battle groups with reduced structures to provide fire support for the entire combat area. In Afghanistan, 4,500 shells (155 mm and 120 mm) were fired to support combined tactical battle groups, and also for targeting purposes to support Special Forces. The CAESAR gun range has significantly expanded the area of action for tactical battle groups. The complementary nature of guns and mortars has been consolidated: the CAESAR guns provide support from forward advanced bases, while mortars maneuver in the contact area. Therefore, regardless of changes in the maneuver, units can be supported laterally, accurately and closer to allied units.

The air-defense and field artillery double qualification of the artillery observation teams allowed all possible fire support to be provided. The strategic projection of fire support was closer to allied units.

Use of fire: Artillery 3rd dimension expertise plays a key role in enabling the tactical combined arms commander to coordinate the actions of all available resources (artillery shells, helicopters, Close Air support, UAVs).

Guyana, Djibouti, Lebanon

Surface-air protection through field compartment control

Air Defense of land forces is carried out by short-range air defense sections (SHORAD). Each platoon has six MISTRAL missiles and detection and control radar (NC1-30 and NC1-40). The advantage of these sections is their ability to deploy in the field and their complementary capability between radar detection and visual surveillance performed by these units in this field. The MISTRAL missile has further enhanced its capabilities with the delivery of the MISTRAL 3 in 2014, which features an increased range (8 km) and which is capable of destroying targets with a smaller signature.

The artillery possesses a full range of ammunition: neutralization, illumination, blinding and warning. It also has guided BONUS anti-tank rounds for effective use in symmetrical or asymmetrical conflicts.

The 1st RA has received GPS-guided rockets for URL since April 2014. They allow destruction of protected targets at a distance of up to 80 km. Current studies focus on guided 120 mm and 155 mm shells, which will be available after 2022.

Mali

Dynamic management of 3D space

The 3rd dimension (3D) resources management capability was decisive: a third dimension defense management center (CMD3D) of the 54th RA was deployed to allow all air-land resources to be monitored and coordinated.

Use of fire: Artillery 3rd dimension expertise plays a key role in enabling the tactical combined arms commander to coordinate the actions of all available resources (artillery shells, helicopters, Close Air support, UAVs).

Evolving technical capabilities

Target acquisition

In the frame of SCORPION program, which will renew and consolidate the operational capacities of combined tactical battle groups, the Army will be equipped with new acquisition resources.

The multi-role armed vehicle (VBMIR) will replace current reconnaissance VABs by 2020. Its equipment allows it to detect and locate targets with ten-meter accuracy in all conditions. It features a 5-meter telescopic mast with day and night vision, and a removable radar, and will significantly improve team observation capabilities.

Studies are underway to improve target localization computing via imaging. They aim to achieve metric accuracy by 2020.

A weapons system whose strengths specifically address the operational needs of forces in stabilization missions:

- Due to the range of the weapons system - up to 80 km - it can shoot without even leaving its forward advanced base.
- Rockets are detected at the last moment, which does not allow the opponent to take cover.
- The terminal angle is vertical, which makes this munition very effective in destroying targets in urban areas, in mountainous areas or in areas protected by rocky knolls.
- The cost/effectiveness ratio is particularly advantageous.

Ammunition

The artillery possesses a full range of ammunition: neutralization, illumination, blinding and warning. It also has guided BONUS anti-tank rounds for effective use in symmetrical or asymmetrical conflicts.

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Effectors: Field Artillery launchers

France currently has four types of launchers:

- 13 URLs will be delivered to the 1st RA before the end of 2014. The URL is the only highly accurate, all-weather and permanent fire support for 2014-2022, with the pending delivery of 155 and 120 mm precision shells.
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- Due to the strategic mobility, the self-propelled 155 mm CAESAR gun showed its effectiveness in Afghanistan and especially in Mali (38 km range).
- The AUF1 155 mm armored tracked self-propelled howitzer (28 km range).
- The robustness and strategic mobility of the RT1F 120 mm towed mortar make it an easy and effective way to support infantry units in combat. In 2002, an on-board automated mortar embedded in a multitone armored vehicle (MEPAD) will support forces in addition to the RT1F towed mortar.
- The unitary rocket launcher (URL).

Above all, the URL can be used at all conditions, and can provide permanent and immediate support. It was used specifically by British forces in combat in Iraq and Afghanistan, and has gradually become the preferred fire support system.

Land & Airland Defence Operations Doctrine and Vision

Air Defense Surveillance and acquisition:

The French Army uses the MARTHA system for the air defense chain of command control systems. It currently has NC1-30 and NC1-40 detection and fire control radars with a range of 20 km to 28 km.

The early warning and 3D surveillance are provided by the 3D GRIFFATE radar and isan by GMI30 radar with a range of 200 km, which will be delivered starting in 2018.

Air Defense launchers:

In addition to the French Air Force’s MAMBA medium range air defense system, French Army has the MISTRAL 2 and MISTRAL 3 short range missiles (extended range of 8 km) with small target capabilities. These missiles are fired from a dismounted tripod (MANPADS) or from a vehicle-based platform (PAMELA). The Army uses also 20 mm guns, mounted on multitone armored platform (VAB) to complete the air defense system.
Artillery (Indirect Fire Support)

Component Breakdown

Sensors: target acquisition capability
In order to detect and identify threats, designate targets and observe the firing results to assess damage and rectify elements transmitted to launchers of the battery, the artillery uses Observation Teams (EOC), deployed inside the combined arms units (Infantry, Armor), with their own equipment capable of performing the tasks described above. Optical and optronic equipment is currently installed on board vehicles with observation devices, able to detect and locate targets both day and night. Observation Teams, mounted or potentially dismounted, use high-accuracy rangefinders and can be equipped with laser designators.

Effectors: indirect fire platforms
Indirect fire support is provided by guns, mortars and rockets. French Artillery is equipped with three types of launchers:
- 155 mm 52 caliber self-propelled CAESAR guns capable of high strategic mobility and 38 km range;
- 81 and 120 mm towed mortars, which deliver an effective fire support for units in contact up to 15 km;
- Unitary Rocket Launchers mounted on tracked platform, with a range of 80 km and metric precision. These launchers may be used as adaptable modules (unitary, dual, a battery of 6 to 8 launchers or a regiment 2 to 4 batteries). More often, before deployment, a reconnaissance team identify firing positions or launchers can fire immediately when rapid deployment in action is decided. Some launchers are equipped with autonomous maneuver and firing capabilities, via inertial navigation systems and integrated firing calculator.

Fire Command & Control Systems
The ability of the artillery to engage targets in neutralization or precision firing and to fire on-target immediately is allowed by transmission in near real time of data provided by observation teams to firing launchers and calculation of position and trajectory data provided by the artillery fire command and control system. Calculators are used at the battery command post and are also available inside the firing platforms, to provide unequalled scalability and versatility. The fire control system is also used to calculate ammunition replenishment. It must also interface with the 3-D Air Traffic and Air Defense management systems to optimize trajectories in airspace.

Weapon effects & ammunition
The artillery is equipped with a full range of 81, 120 and 155 mm caliber ammunition, for neutralization, illumination, blinding and warning. It is also provided by guided, selective anti-tank rounds for use in all types of conflicts. URL rockets guided by GPS allow protected targets to be destroyed at up to a distance of 80 km and with nearly metric precision. Current studies focus on guided 120 mm and 155 mm shells, which will be available after 2020.

Replenishment & Logistics
After firing, munitions must be replenished by transportation and logistic units to the areas managed by artillery units. In addition to transportation and storage, munitions management, pallet handling, repackaging and neutralization-destruction functions must also be performed.
ASB Group gathers the thermal batteries activities from its 2 prestigious shareholders:

ASB Group is a subsidiary of EADS France, 50% shareholder, and is also linked with the company SAFT, 50% shareholder.

ASB Group is located in France (Bourges), and has subsidiaries in UK (MSB near Glasgow) and in USA (ATB in Cockeysville, MD).

The technology of Thermal Battery brings an exceptional level of reliability, in the most extreme conditions. For example:

- 100% of the performances are guaranteed on a spectrum over 130°C
- Before firing of the battery, this latter is a solid, and so perfectly inert material. No maintenance. Life cost equal to purchased cost.
- Life duration is fixed to 15 years, far from the technical limit...
- The ASB portfolio is from 14 g to 67 Kg, from some W to over 100 KW, with the same level of technology reliability.

The ASB thermal batteries are integrated in all types of the most sophisticated armaments. The ammunition ground-to-ground, ground-to-air, air-to-ground, but also all the naval applications ship-to-ship, ship-to-air, and under-water systems, are equipped with thermal batteries:

- Missiles GROUND-AIR-SEA
- Rockets GROUND-AIR-SEA
- Clever shells of all calibers (Artillery, Tank, Medium calibers for Infantry and air-defense guns)
- Air-to-ground Bombs with terminal guidance kit
- Torpedoes (light & heavy ones)
- Launchers and associated posts for the above ammunition
- Combat aircrafts, ejection seats, emergency power supplies
- Launchers and satellites for space

The customers are mainly the Systems and Ammunition producers: the majority of the European clever ammunition is equipped with ASB batteries; and it is the same for the most advanced US products. Wherever technology and reliability are driven factors, ASB is the best supplier. Our main customers are MBDA, ASTRIUM, Lockhead Martin, Alliant Tech Systems, Boeing, as well as Korean Companies, South-African DENEL DYNAMICS, and a lot of others.

It is to be noted that ASB is regularly granted with top rank level for customers satisfaction:

- ASB is investing for the Long Term Future.
CILAS (Compagnie industrielle des Lasers)

For over 40 years, CILAS has been at the leading edge of the modern technology sector thanks to its unique expertise in laser and optronic technologies.

Innovations in laser target designation

The DHY - 307 LW is the evolution of the combat proven DHY - 307. As the DHY - 307, the DHY - 307 LW (light weight) can operate with NATO and other laser guided weapons. However, the Light Weight is two times lighter than the DHY - 307 (mass= 4 Kg) and is more compact. One of the main evolutions of this version is its athermal diode pumped laser that doesn’t need an active cooling system. The electrical consumption is also reduced. The DHY - 307 LW is equipped with an internal see spot camera and compatible with various thermal imagers. This equipment has been tested by the French forces for one year and the results are fully conclusive.

All the work made to increase the compactness allows CILAS to integrate laser designators into helicopters and soon in drones. CILAS has already developed two laser modules which can be embedded in gimbals, the AlaDeM - R (1400g) and the MiniDeM - R (1050g). They are two athermal modules used for designation and range finding. Both are compliant with NATO and other laser guided munitions. These modules have a very low residual consumption in stand-by mode. The AlaDeM - R is for a long range using (up to 10 Km) and the MiniDeM - R for medium range using (up to 5 Km).

Pre-shot sniper detection system

The SLD 500 surveillance and detection laser system contributes to the protection and surveillance of sensitive areas (FOB, Green Zone, etc.). Based on CILAS laser and optronic expertise, the SLD 500 includes the latest active laser imaging and camera technology. It detects and locates before shooting, any kind of optical sight system: optical scopes used by snipers or optronic sight systems used by enemies’ surveillance or recon.

About a hundred systems are now used over the world. This system is operational in open fields and also in urban areas.

CILAS will release the SLD-Scout, a portable version of the SLD500 (smart goggles, -2kg). This new detection system will respond to the needs of a platoon, convoy or VIP protection team.

CMI DEFENCE

Cockerill systems – a response to artillery needs

A subsidiary of the CMI Group (Cockerill Maintenance & Ingénierie), CMI Defence is the undisputed leader in high power (20-120 mm) multifunctional weapons systems for light and medium armoured vehicles.

With the strength of its skills in software, ballistics and mecatronic engineering behind it, CMI Defence has always developed polyvalent systems which respond to the needs of armed forces across the whole world. The fire support offered by its weapons systems, (CT-CV for example), have thus proved very successful with its clients.

The man-machine interface has been designed to integrate the necessary parameters required for firing to be carried out manually or automatically, along with messages and visual aids for targeting and firing.

Developed around modular architecture, the Cockerill 90 mm and 105 mm calibre weapons systems have seen their operational capacities increased by the function for firing beyond line-of-sight. The product architecture enables the integration of sensors and the necessary exchange of information for this function, an inertial platform, data transfer, and management systems for theatres of operations.

CMI DEFENCE is more than ever putting its stakes on innovation, R&D and on consolidating its partnerships in this domain.

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In 2010 DCI implemented its own training structure within the Draguignan military schools. It can thus welcome foreign officers and NCOs within the Artillery or Infantry schools. The courses provided cover the military, technical and human domains in order to ensure a high level of competences, including in the security, for the positions:

• Battalion commander
• Unit commander
• Platoon leader
• Gun crew leader

Training for operational maintenance, armament, electronics and mobility are organised with the Military Mechanical Engineer School in Bourges.

DCI is offering personalised services of on-site operational assistance enabling to optimise the appropriation of new systems.

DCI also has the ability to contribute to the conception, the instrumentation-simulation and the conduct of training centres. Therefore, DCI’s global operational appropriation service offer is complementing those of the manufacturers for the benefit of armed forces of France’s friendly countries.

As operator of the French Ministry of Defence in the transfer of military know-how, DCI is offering solutions of consulting, training and assistance in the field of indirect fire support, guns and mortars.

Wherever the success of missions is of the essence, users can rely on the security and reliability of Davey Bickford’s products. Unrivalled know-how in primary explosives and industrial control of energetic materials and components proven for decades allow the company to support clients with the key benefits of pyrotechnic initiators and initiation systems.

As first active element of the pyrotechnic chain, initiator is a critical component, crucial for both the security and the reliability of systems and ammunitions:

• during passive and active storage (including monitoring) phases of systems and ammunitions, initiators must be able to withstand severe ambiance conditions without any risk for safety and security.
• as for the active phase of missions, once the firing command is applied, initiators shall then react in a very short time (typically a fraction of millisecond !) to start the pyrotechnic chain.

The pyrotechnic effect of Davey Bickford initiators can be adjusted on demand so that, depending on the initiation function expected, it can be generated temperatures, gases or shock wave effects.

Last but not least, the panel of initiation solutions offered also includes the range of pyromechanic devices which, in some cases , although offering the same unequalled fast reaction time and amplification signature effects of initiators, can be registered as “non explosive devices”.

A few example of pyrotechnic initiation solutions used for terrestrial defence applications:

• Artillery fuses: our micro-detonators are generally used to activate the safe and arm unit located in the head of fuses.
• As for military launchers application, we are able to provide any type of igniters as needed for the activation of the different modules integrated in a missile system rocket igniters, thermal battery initiators, gyroscope actuators, thrusters, retractors etc...
• Decoys and flares: our igniters can be used both for decoys and flares dispensing as also activation of special materials
• Davey Bickford conventional detonators and detonating cords are used for destruction and demolition operations conducted by terrestrian forces

Not only safe and reliable products Davey Bickford can also support customers with dedicated services including but not limited to: special packagings, transport classification, obsolescence management, REACH compliance, training, testing, storage, destruction.

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DIXI MICROTECHNIQUES

Designer and manufacturer of micromechanical and microtechnical solutions for ammunition

DIXI Microtechniques set up in 1988 by the merger of the defense industry branch of the Swiss DIXI group, historic manufacturer of mechanical time artillery fuzes and a subsidiary of the French Matra group, expert on safety devices for ammunition.

Located in Besançon France, capital of European Microtechniques, the company benefits of top-quality components issued from the watch making tradition, high qualified engineers and skillful operatives.

DIXI Microtechniques develop its own products from identified needs of the market, or in partnership with the main European ammunition manufacturers : mechanical fuzes and safety devices for ammunition.

DIXI Microtechniques has the proficiency and resources needed to design and manufacture complex mechanical or electromechanical functions.

The company can provide PD, MT or MTSQ artillery fuzes, safety and arming devices, all products meet operational requirements and the most modern standards, especially in 155mm/52 calibers artillery sector.

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EURENCO

Your Partner for Energetic Materials.
Unmatched Expertise. Proven Solution.

Created in January 2004 from the merger between SNPE Explosives & Propellants, NEXPLO Bofors and NEXPLO Vihtavuori, EURENCO inherited its parents’ centuries of in-depth knowledge of energetic materials.

Widely acknowledged for its high level of expertise and know-how in chemical synthesis and transformation of energetic molecules, EURENCO develops, manufactures and provides a largely diversified range of cutting-edge energetic materials for both the defence and the commercial markets.

With regards to Artillery applications, EURENCO offers a unique range of products and services, from R&D to serial production:

• High explosives (Conventional & Insensitive) for melt-cast, pressed and cast PBX explosive charges;
• Cast PBX charges for Insensitive shell ammunition;
• Base Bleed grains for extended range artillery ammunition;
• Single and multi base propellants for small to large caliber military ammunition, mortar increments, recoilless antitank weapons;
• Low vulnerability (LOVA) propellants for Insensitive propelling charges;
• Modular Artillery Charge System (MACS) for artillery ammunition;
• Combustible Cartridge Cases (CCC’s) for tank and artillery ammunition;
• Nitrifilm for mortar honeshoe containers.

To ensure both flexibility and large-scale capabilities, EURENCO is equipped with modern and innovative facilities, including multipurpose synthesis units as well as automated workshops for the loading of Inensitive Munitions and manufacturing of Modular Artillery Charge Systems.

A leading European company for military explosives, propellants and combustible items, EURENCO also provides explosives for the civil sector (oil & gas perforation, mining), and owns the world’s largest production capacity for 2-EHN (diesel fuel additive).

Based in Paris, EURENCO operates 4 modern production plants in France (Bergerac, Sorgues), Belgium (Clermont) and Sweden (Karlskoga).

A favored partner of major companies worldwide, EURENCO is increasingly involved in new international programs.

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The French-German Research Institute of Saint-Louis (ISL) is a bi-national institute established by the French Republic and the federal republic of Germany on the basis of a treaty signed in 1958. ISL was founded as a homogeneous bi-national research institute with its own legal personality. ISL is placed under the authority of a board of directors with three German members and three French members assisted by a scientific Advisory Council for scientific matter.

The original mission of ISL was “research, scientific studies and basic predetermination in the armament domain”. The classical working areas of ISL include: materials and nanomaterials, laser-matter interaction, laser development, detonics, perforation, protection, ballistics, the environment and protection of the soldier, acoustics, power electronics, electromagnetic railgun, high power microwaves, aerodynamics and flight mechanics, optoelectronics, sensors, change detection, THz, artificial intelligence.

In a network of partnerships with other European institutes, technical and scientific services and industrial partners, ISL offers its scientific and technological competence to the Ministries of Defence for the development of new technologies to assure the current and future capabilities of the armed forces. The technological concept of the BMVg and the corresponding document of the DGA in France have led ISL to focus its capabilities into key multidisciplinary projects; i.e. threat characterisation and protection against improvised explosive devices (IED), nanomaterials, lightweight medium caliber weapons, guided supersonic projectiles.

ISL has reinforced its activities on problems of security and counter-measures against terrorism encountered both at home and during overseas military operations and have studied the following subjects:

- area surveillance, sensor network technology, active imaging, image processing, reconnaissance in urban environments;
- communication in noisy environments, sniper detection;
- explosive detection, synthesis of material for detection, theory and experiments on nuclear quadrupole resonance detectors;
- high power microwaves for the ignition of explosive devices;
- fundamental research on IED threats and the development of protective measures.

The high quality of the ISL results has allowed a large amount of cooperations and works under contracts with the European industries. ISL has the possibility to use various testing facilities of different scientific domains. This variety of testing devices offers a multidisciplinary approach to testing campaigns. Synergies of different technologies offer ISL the possibilities to explore new technologies.

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**RENAULT TRUCKS DEFENSE**

RENault TRUCKS Defense, part of Volvo Group Governmental Sales, is a multi-brand holding company including ACMAT Defense and PANHARD Defense.

RENAULT TRUCKS Defense’s product range is made of armored and tactical vehicles, tactical and logistic trucks as well as lifecycle support and mobility solutions.

The tactical and armored vehicles range includes several families of vehicles from 3.5 to 20 tons of GVW which can be customized according to customer needs. The VAB (incl. VAB Mk1 and VAB Ultima 4x4s and VAB Mk3 6x6), MIDS 4x2/4x4, Sherpa Light 4x4, VLRA 2 4x2/6x6, Bastion 4x4, VBR 4x4, PVP 4x4, VBL 4x4 and ALTV 4x4 families are widely used in the French Army and other countries worldwide. They are able to fulfill all the requirements of Defense and Homeland Security missions such as reconnaissance, troop transport, patrol, support, special forces, command and liaison, crowd control, firefighting, crisis management, border surveillance.

The Kerax, Sherpa Medium and Midlum families of logistic and tactical trucks, with a GVW from 14 to 42 tons (4x4 to 8x8), are able to fulfill all logistic missions involving the supply of fuel, water, ammunition, heavy equipment, spare parts or troops. They are also able to carry weapon or command & control systems on the battlefield or to recover disabled vehicles.

RENAULT TRUCKS Defense Group also provides its industrial partners with mobility solutions such as a 8x8 high-mobility driveline for heavy armored vehicles, 4x4 / 6x6 special chassis and components (powerpacks).

Last but not least, RTD, ACMAT and Panhard provide a complete range of support services, including upgrade and reset programs, to give users the assurance that their vehicles will be able to be used to their full capability during their whole lifecycle. The quality of these services is based on a scaled organization, comprising support centers, an international network of more than 1,500 service points, a hotline and standard replacement capabilities.
ROXEL

The European leader in manufacturing rocket motors for tactical weapon systems.

Roxel is the European leader in the design and manufacture of solid rocket propulsion systems for a range of tactical weapons. With dedicated research, engineering and delivery teams, Roxel offers innovation and capabilities throughout the product life cycle from design, simulation, development and qualification, testing, series production and in service support and disposal.

The teams also offer research and technology capabilities, providing innovative solutions for new propulsion systems from the initial concept stage. Roxel also has capabilities in the design and manufacture of metallic structures and composite materials for a wide range of applications including aerospace.

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SAGEM (SAFRAN)

Sagem is a world leader in electronics, optronics, navigation/aiming and information systems applied to artillery systems.

High Precision, quick Reconnaissance

A world-renowned specialist in inertial and satellite navigation, Sagem designs topographical coordinates support, reconnaissance and positioning systems for artillery batteries (picture). The company’s NOMAD, ULISS 30 and Sigma 30P systems are mounted on support or coordinates survey vehicles, for artillery units deployed by France and several other armed forces.

Target Designation from the Ground

Sagem’s combined skills in optronics and navigation allow it to offer a wide range of target designation systems, for specialized observation vehicles such as the VAB-DBS deployed by French artillery units, or portable systems for artillery, or the man pack type TACP. The company’s expertise in vibrating gyro’s allows it to offer lightweight systems featuring exceptional performance, such as the JIM-LR and Sterna units (picture). Sagem also provides the CM3 direct sighting system for artillery.

Target Designation from Tactical UAVs

Sagem’s drone systems were deployed by Western armed forces (Canada, Netherlands and France) during about ten years in Afghanistan, where they designated targets for artillery units. The new Patrolier (picture) drone now offers enhanced precision and endurance to support land forces, especially artillery units.

High-Rate, High-Precision Firing

Sagem’s Sigma 30 navigation/pointing system is used on the PzH 2000 tracked guns deployed by Germany and Qatar, the Caesar guns (picture) deployed in France, Thailand, Indonesia and Denmark, the Archer systems for Sweden and Norway, and many other systems from around the world. This navigation and fire control system now enables not only quick battery deployment against improvised targets, but also independent firing by artillery pieces. For artillery batteries, Sagem offers the Spider Artillery fire control and calculation system. On Mithral air defense missiles, the company also provides the seekers as well as optronics for ground launch stations.

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TDA ARMEMENTS SAS

Since World War I, Edgar William BRANDT and its followers are recognized as world class manufacturers in mortar warfare. With JUNGHANS-T2M, TDA ARMEMENTS SAS conducts development programmes enhancing the whole range of munitions.

Renowned for a lot of qualities, the BRANDT mortars have been improved in the 1960s by adoption of a new kind of tube, that was rifled like the howitzers’ ones, in order to gain in reach, precision and accuracy.

Since this time, the 120mm Rifled Towed Mortar (RTM) is the only one of its type already in service throughout the world. Its robustness, its reliability and its light logistical footprint make the 120mm RTM the first Artillery fire support equipment to be deployed into a military operation overseas. Its maximum range (from 8 to 13 kilometres…) gives the tactical echelon the opportunity to manoeuvre under the cover of a though indirect fire support.

The 120mm RTM can be dismantled into four plots and then transported either by airlift, in a tactical transport aircraft or in the cabin of vehicles.

Since 2004, TDA ARMEMENTS SAS proposes a mounted versions of its 120mm RTM:

• The Rifled, Recoiled Mounted Mortar (2R2M). In this version, the classical 120mm rifled tube is associated with an hydraulic recoiling asset, together with a semi-automatic loading mechanism and a full automatic aiming and elevation system, which makes it a complete weapon system, integrally operated with only a crew of four person. It is then able to shoot 10 rounds within one minute, with improved accuracy compared to the towed version, and can start moving and close the top doors at the same time.

TDA ARMEMENTS SAS proposes a complete set of classical mortar ammunition, covering the average palette of Fire Support Missions (FSM) benefiting to the Troops In Contact (TIC):

• The High Explosive (HE) shells are shot up to a range of 8,300 meters.
• The Anti Armour Ammunition (AAPC) damage armoured vehicles.
• The Smoke (SMK) shells are used either to mark the terrain for Close Air Support (CAS), Close Air Attack (CCA), or the generation of a smoke curtain. They also may be employed as warning shot across the bows.
• The Rocket Assisted Projectile (RAP) is able to reach its target up to 13 kilometres.
• The Anti Armour Ammunition (AAPC) damage armoured vehicles.
• The Illuminating shells (ILLUM) produce either Visible light or invisible beams illuminating the battleground for Infrared (IR) devices.

TDA ARMEMENTS SAS also develops a 120 mm Metric Guided Munition (MGM), laser-guided onto the target by a forward observer.

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THALES COMM@NDER FIRE

From fire-control to the digitized artillery system.

Artillery is currently undergoing a real transformation by the renewal of its resources, its processes and its use. In addition to maintaining traditional skills, modern artillery units may constrain the enemy’s maneuver only by the presence of the threat of their fires.

In this respect, the Comm@nder Fire system, facilitates the design and conduct of combined and even joint maneuver. Indeed, the use of a digital command system and the increased mobility of effectors facilitate the initiative and seizing opportunities for the entire task force.

Finally, by its recent ability to apply accurate and timely fires - and not just saturation - artillery is able to participate in making the ascendancy on the opponent, while contributing to the commander’s freedom of action, thanks to Comm@nder Fire system.

Comm@nder Fire is a scalable family of artillery systems, totally capable of addressing the full spectrum of modern artillery units missions (command and control, planning, execution , target acquisition , conducting the maneuver, intelligence, logistics, counter-battery …).

Open and flexible, adapting to the specific requirements of gunners (the concept of employment, legacy…), Comm@nder Fire also offers a guarantee against future scalability constraints and future challenges in the following areas:

• Introduction of new types of weapons and/or ammunition,
• Fire accuracy and increased range by the use of smart ammunition,
• Force protection, responsiveness of fire support and reducing fratricide,
• Interoperability of battlefield artillery,
• Joint fire support (Combined Arms, Air and Navy) particularly in:
  • Participating in the deconfliction of the airspace,
  • Adding JTAC capabilities to Advanced Observers,
  • Taking into account multi-level security issues,
• Managing continuity in mounted-dismounted mode, particularly for Observers/JTAC,
• Accompanying digitization of the battlefield (C4I interoperability with terrestrial components)

Based on operational experience of over 30 years, Comm@nder Fire highlights the expertise of Thales on Artillery C4I system (ATLAS in France), through many achievements including the digitization of many artillery battalions and integration of various artillery pieces (120mm mortars: 120RT and 2R2M, 155mm guns: M102 and L115, 155mm guns: M109, M108, CAESAR, G5, G6, TRF’), rocket Launcher HMMARS, Faco, LRU …)

Modern digitized artillery units

Fire Control Command Post

Mounted-dismounted Observers integrated equipment

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GICAT (French Land and Air-land Defence and Security Industry Association) is a professional organization established in 1978 grouping over 260 French companies, including the main industrial prime contractors, equipment suppliers, system integrators and a network of dynamic and innovative SMEs.

These companies, which have a diverse range of activities (industrial contractors, consultancy and service providers, as well as clusters and research institutes), offer the full range of skill and know-how adapted to the operational requirements of the land and Air-land Defence and Security sector.

GICAT’s international development is based on the Eurosatory international trade show, organized by its subsidiary COGES, and mainstream defence and/or security trade shows abroad.